Center Independent Research & Development: GSFC IRAD

Atomic Interferometer Gravity Gradiometer Simulation Environment

Completed Technology Project (2017 - 2018)

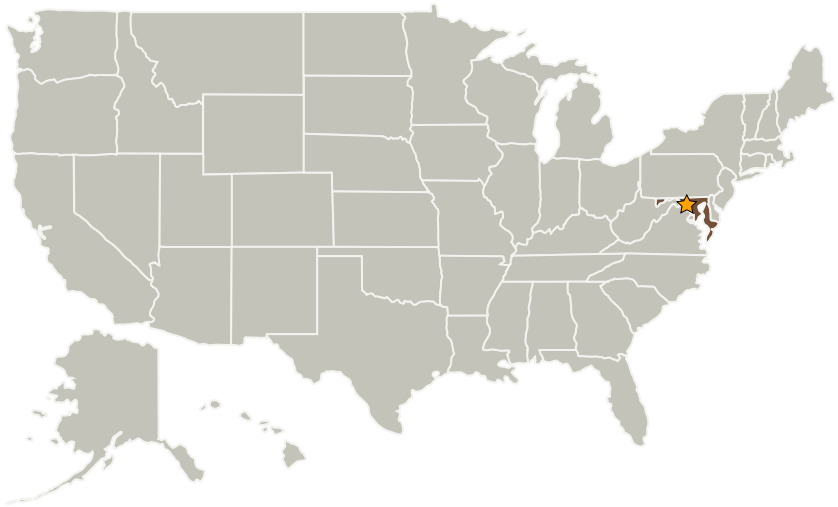
Project Introduction

The Atomic Interferometer Gravity Gradiometer (AIGG) is a next-generation gravity gradiometer capable of improving the accuracy and spatial resolution of time-variable gravity observations. The challenges present in the AIGG measurement environment warrant development of the spacecraft attitude control system (ACS) in concert with the AIGG instrument development. This IRAD focuses on the ACS analysis and design component.

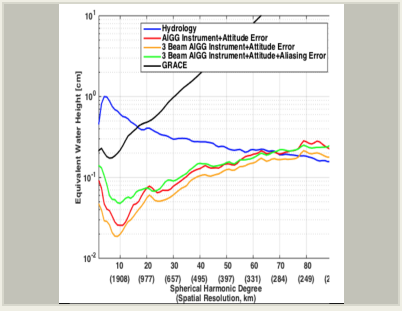
Anticipated Benefits

For the AIGG to achieve its full potential, it must operate in a low-altitude orbital environment. At low altitudes, the atmospheric-drag disturbance is high. The AIGG measurement quality is very sensitive to spacecraft disturbances, and thus the ACS must obey very stringent attitude performance and stability requirements. Design and analysis of a "drag-free" ACS is the best method of achieving this. The focus of this IRAD is to identify the orbital regimes where drag-free ACS is most feasible, and baseline a drag-free ACS for future design and development.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland



AIGG_Grav_Improvement

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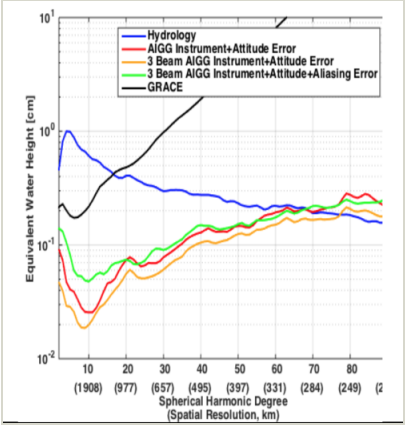
Primary U.S. Work Locations

Maryland

Images



Projected Gravity Model Improvement of AIGG
AIGG_Grav_Improvement
(https://techport.nasa.gov/image/28320)

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Managers:

Jason W Mitchell
Matthew J Mcgill
William E Cutlip

Principal Investigator:

Suyog S Benegalrao

Co-Investigator:

Scott B Luthcke

Atomic Interferometer Gravity Gradiometer Simulation Environment

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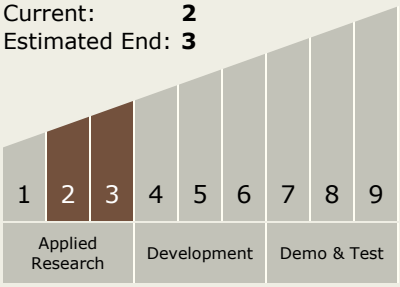
Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destination

Earth